भारतीय मानक
Indian Standard

IS 16629 : 2017

मोटर वाहन के लिए ED 95 ईंधन में इस्तेमाल के लिए सजल इथेनॉल — विशिष्टि

Hydrous Ethanol for Use in ED 95 Automotive Fuel — Specification

ICS 75.160.20

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Petroleum and Their Related Products of Synthesis or Biological Origin Sectional Committee, PCD 3

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Petroleum and Their Related Products of synthesis or biological origin Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

IS 15464 'Anhydrous ethanol for use in automotive fuel — Specification' is used to make blends of anhydrous ethanol with gasoline (petrol). Currently anhydrous ethanol blend as petrol extender E 5 (5 percent ethanol and 95 percent petrol) and E10 (10 percent ethanol and 90 percent petrol) are being used in existing spark ignited petrol engines — powered automotive vehicles. Anhydrous ethanol formulated as E 85 fuel is a blend of Ethanol 70 to 85 percent with petrol which is recommended as fuel for Flexi Fuel Vehicles (FFV) which are powered by specially designed spark ignited engines. These engines can operate effectively without any performance deterioration for blends upto 85 percent ethanol content.

Recent technology development has shown that Ethanol can also be used as fuel in Compression ignition type engine. This requires very specific development of engine which is more like a conventional diesel engine but totally redesigned to suit to the fuel characteristics of Ethanol. The properties like Cetane number, Flash point and distillation are drastically different compared to diesel fuel.

There are few OEMs who have successfully developed engines which uses Ethanol fuel with addition of some special additives and with water addition which is termed as ED 95 fuel. Though the ED 95 fuel is presently specific to OEM recommended requirements, however it is being envisaged to develop a general specification for Ethanol to be blended to make ED 95 fuel.

The requirement of acidity is very important as even very dilute aqueous solutions of low molecular weight organic acids, such as acetic acid, are highly corrosive to a wide range of metals and alloys. It is therefore necessary to keep such acids at a very low level.

The Committee responsible for the preparation of this standard acknowledged that a standard, IS 323 Rectified spirit for industrial use, already exists which can be used as fuel. However, the Committee decided to make a separate standard for use of ethanol as automotive fuel applications. It is expected that this new standard could be reviewed subsequently based on the experience gained through actual implementation. The Committee also was of the opinion that the manufacturers of rectified spirit can also produce ethanol for automotive fuel purpose.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded value should be the same as that of the specified value in this standard.

Indian Standard

HYDROUS ETHANOL FOR USE IN ED 95 AUTOMOTIVE FUEL — SPECIFICATION

1 SCOPE

This standard prescribes the requirements, methods of sampling and test for hydrous ethanol which is the main component to formulate ED95automotive fuel for modified compression ignition engines.

2 REFERENCES

The standards listed in Annex A contain provisions, which through reference in this text constitute the provisions of the standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard.

3 TERMINOLOGY

For the purposes of this standard, the definitions given in IS 15464 shall apply.

4 REQUIREMENTS

4.1 Description

The material shall be a clear, colourless, homogenous liquid free from suspended matter and consist essentially of ethanol blended with water.

4.2 Composition

The material shall essentially consist of ethanol with small quantities of water.

4.3 Denaturant

The denaturant to be mixed with ethanol and the proportion in which it is to be used shall be as prescribed by law from time-to-time (*see* IS 4117).

4.4 The material shall also comply with the requirements prescribed in Table 1 when tested as per method prescribed in col 4 of Table 1.

5 PACKING

5.1 The material shall be packed in containers and packages as agreed to between the purchaser and the vendor, subject to the provisions of law in force from time-to-time.

5.2 Containers used for packing the material shall be dry, clean and leak-proof.

5.3 Necessary safeguards against the risk arising from the storage and handling of large volume of flammable liquids shall be provided and all due precautions shall be taken at all times to prevent accidents or explosions.

Table 1 Requirement for Ethanol for ED 95 Automotive Fuel

(*Clause* 4.3)

Sl No.	Characteristics	Requirement	Ref to Test Method as IS/ISO/EN/DIN
(1)	(2)	(3)	(4)
i)	Total alcohol (Ethanol incl. content on higher saturated alcohols), percent (*m/m*),*Min*	92.4	EN 15721
ii)	Higher saturated mono- alcohols (C3 - C5), percent (*m/m*), *Max*	2	EN 15721
iii)	Methanol, percent (*m/m*), *Max*	0.5	EN 15721
iv)	Density @ 15°C, kg/m^3	808-814	ISO 12185
v)	Flash point, °C, *Min*	10	ISO 3679
vi)	Acidity, calculated as acetic acid, percent (*m/m*), *Max*	0.005	EN 15491
vii)	Aldehydes calculated as acetic aldehydes, percent (*m/m*), *Max*	0.025	ISO 1388 - 4
viii)	Water content, mg/kg	4.5-7.4	IS 2362/ EN 15489/ ISO 12937/ EN15692
ix)	Sulphur content, mg/kg, *Max*	10	EN15485/EN 15486
x)	Inorganic chloride, mg/kg, *Max*	1	EN 15484/EN15492
xi)	Copper content, mg/kg, *Max*	0.1	EN15488
xii)	Dry residue, mg/kg, *Max*	65	EN15691
xiii)	Total contamination, mg/kg, *Max*	24	EN12662
xiv)	Electrical conductivity, µS/cm, *Max*	500	DIN 51627-4/PrEN 15938

5.4 Except when they are opened for the purpose of cleaning and rendering them free from alcohol vapour, all containers shall be kept securely closed after they have been thoroughly cleansed and freed from alcohol vapour.

6 MARKING

6.1 Each container shall be legibly and indelibly marked with the following:

a) Name of the material;
b) Manufacturer's name;
c) Net, gross and tare weight;
d) Recognized trade-mark, if any;
e) Date of packing/manufacture;
f) Only for automotive use;
g) Highly flammable; and
h) Hazardous chemical and injurious to health.

6.1.1 *BIS Certification Marking*

The container may also be marked with the Standard Mark.

6.1.1.1 The use of the Standard Mark is governed by the provisions of the*Bureau of Indian Standards Act,* 1986and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 SAMPLING

Representative samples of the material shall be drawn as prescribed in Annex K of IS 15464.

8 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

ANNEX A
(*Clause* 2)

REFERENCES

IS/International Standard No.	*Title*
323 : 2009	Rectified spirit (*second revision*)
1070 : 1992	Reagent grade water (*third revision*)
2362 : 1993	Determination of water by Karl Fischer method — Test method (*second revision*)
4117 : 2008	Alcohol denaturants — Specification (*second revision*)
15464 : 2004	Anhydrous ethanol for use in automotive fuel — Specification
ISO 1388-4	Ethanol for industrial use — Methods of test — Part 4: Estimation of content of carbonyl compounds present in moderate amounts — Titrimetric method
ISO 3679	Determination of flash point — Rapid equilibrium closed cup method
ISO 12185	Crude petroleum and petroleum —Determination of density — Oscillating U-tube method
ISO 12937	Petroleum products — Determination of water — Coulometric Karl Fischer titration method
EN 12662	Liquid petroleum products — Determination of total contamination in middle distillates, diesel fuels and fatty acid methyl esters
EN 15484	Ethanol as a blending component for petrol— Determination of inorganic chloride — Potentiometric method
EN 15485	Ethanol as a blending component for petrol — Determination of sulfur content — Wavelength dispersive X-ray fluorescence spectrometric method
EN 15486	Ethanol as a blending component for petrol— Determination of sulfur content — Ultraviolet fluorescence method
EN 15488	Ethanol as a blending component for petrol-Determination of copper content — Graphite furnace atomic absorption spectrometric method
EN 15489	Ethanol as a blending component for petrol — Determination of water content — Karl Fischer coulometric titration method
EN 15491	Ethanol as a blending component for petrol — Determination of total acidity — Colour indicator titration method
EN 15492	Ethanol as a blending component for petrol — Determination of inorganic chloride and sulfate content - Ion chromatographic method
EN 15691	Ethanol as a blending component for petrol — Determination of total dry residue (involatile material) — Gravimetric method
EN15692	Ethanol as a blending component for petrol ¯ Determination of water content — Karl Fischer potentiometric titration method
EN 15721	Ethanol as a blending component for petrol — Determination of higher alcohols, methanol and volatile impurities — Gas chromatographic method
DIN 51627-4	Automotive fuels — Test methods — Part 4: Determination of electrical conductivity in ethanol fuel
PrEN 15938	Automotive fuels —Ethanol blending component and ethanol (E 85) fuel — Determination of electrical conductivity

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Amendments Issued Since Publication

Amendment No.	Date of Issue	Text Affected

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